

ABSTRACT OF THE DISCLOSURE

A laterally translatable pressure staged rotary shaft sealing mechanism having a seal housing with a shaft passage therein being exposed to a fluid pressure P_1 and with a rotary shaft being located within the shaft passage. At least one annular laterally translatable seal carrier is provided. First and second annular resilient sealing elements are supported in axially spaced relation by the annular seal carriers and have sealing relation with the rotary shaft. The seal housing and at least one seal carrier define a first pressure staging chamber exposed to the first annular resilient sealing element and a second pressure staging chamber located between and exposed to the first and second annular resilient sealing elements. A first fluid is circulated to the first pressure chamber at a pressure P_1 , and a second staging pressure fluid is circulated to the second pressure chamber at a fraction of pressure P_1 to achieve pressure staging, cooling of the seals. Seal placement provides hydraulic force balancing of the annular seal carriers.